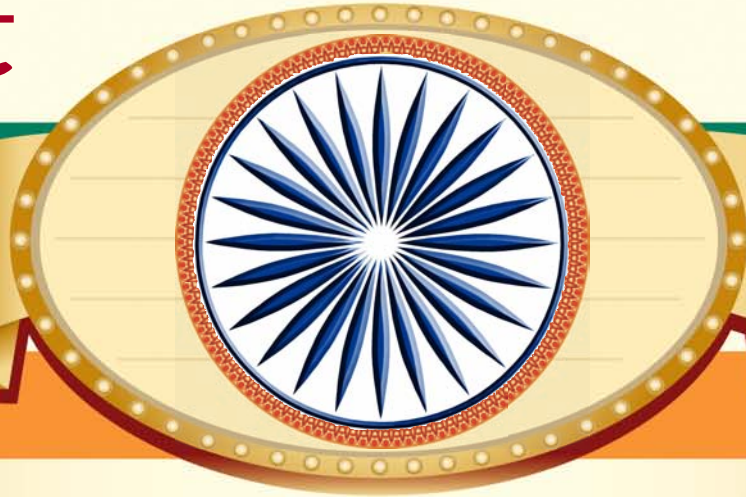


इंटरनेट

मानक



Disclosure to Promote the Right To Information

Whereas the Parliament of India has set out to provide a practical regime of right to information for citizens to secure access to information under the control of public authorities, in order to promote transparency and accountability in the working of every public authority, and whereas the attached publication of the Bureau of Indian Standards is of particular interest to the public, particularly disadvantaged communities and those engaged in the pursuit of education and knowledge, the attached public safety standard is made available to promote the timely dissemination of this information in an accurate manner to the public.

“जानने का अधिकार, जीने का अधिकार”

Mazdoor Kisan Shakti Sangathan

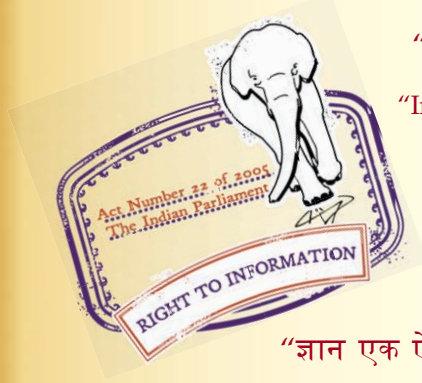
“The Right to Information, The Right to Live”

“पुराने को छोड़ नये के तरफ”

Jawaharlal Nehru

“Step Out From the Old to the New”

IS 10426 (1983): Public Address Amplifiers [LITD 7: Audio, Video and Multimedia Systems and Equipment]



“ज्ञान से एक नये भारत का निर्माण”

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“Invent a New India Using Knowledge”



“ज्ञान एक ऐसा खजाना है जो कभी चुराया नहीं जा सकता है”

Bhartrhari—Nitiśatakam

“Knowledge is such a treasure which cannot be stolen”



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IS : 10426 - 1983

(Superseding IS : 1490-1959 and IS : 1819-1961)

Indian Standard
SPECIFICATION FOR
PUBLIC ADDRESS AMPLIFIERS

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INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
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*Indian Standard*SPECIFICATION FOR
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Indian Standard

SPECIFICATION FOR PUBLIC ADDRESS AMPLIFIERS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 28 January 1983, after the draft finalized by the Acoustics Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

0.2 This standard covers the general and performance requirements for public address amplifiers including the safety aspect.

0.3 The requirements for public address amplifiers were previously covered by IS : 1490-1959* and IS : 1819-1961†. These Indian Standards will now be superseded by this standard which covers the latest requirements of public address amplifier including the semi-conductor version.

0.4 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960‡. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard specifies general and performance requirements of public address amplifiers.

2. TERMINOLOGY

2.0 For the purpose of this standard the terms and definitions given in IS : 1885 (Part XLVIII)-1978§ and IS : 9302 (Part II)-1979|| shall apply in addition to the following.

*Recommendations for minimum performance requirements of mains-operated public address amplifiers.

†Recommendations for general requirements of public address amplifiers.

‡Rules for rounding off numerical values (*revised*).

§Electrotechnical vocabulary : Part XLVIII Recording, Section 1 Tape recording; and Section 2 Disk recording.

||Characteristics and methods of measurements for sound system equipment : Part II Amplifiers.

2.1 Type Tests — Tests carried out to prove conformity with the requirements of the relevant specification. These are intended to check the general qualities and design of a given type of amplifier.

2.2 Acceptance Tests — Tests carried out on samples selected from a lot for the purpose of acceptance of the lot.

2.2.1 Lot — All amplifiers of the same type, category and rating manufactured by the same factory during the same period using the same material and process.

2.3 Routine Tests — Tests carried out on each and every unit to check the requirements which are likely to vary during production.

3. GENERAL REQUIREMENTS

3.1 The mechanical requirements shall be such that the amplifier complies with the relevant requirements specified in IS : 616-1981*.

3.2 Materials and components used in manufacture of the amplifier shall be in accordance with the relevant Indian Standards.

3.2.1 Those components which determine safety of the apparatus against risk of electrical shocks and fire (for example, transformers, fuses and fuse holders, output and main connectors blocks) shall conform to the relevant requirements specified in IS : 616-1981*.

4. INDICATORS, CONTROLS AND OTHER FEATURES

4.1 A double role type power switch shall be provided which shall disconnect the power supply line when in ' OFF ' position. The ON-OFF mode of the amplifier shall be clearly indicated. If the power switch from part of the amplifier gain control, it shall conform to the relevant safety requirements.

4.2 Volume Control — Easily accessible control shall be provided to adjust the amplifier gain.

4.3 Tone Control — Suitable tone control(s) shall be provided.

4.4 Master Control — Suitable master control may be provided.

4.5 Input — The amplifier shall have one or more microphone inputs and one or more phono/auxiliary inputs.

4.6 Output Tappings — Multiple output impedance tappings of 4 Ω , 8 Ω and 16 Ω shall be provided. In addition, constant voltage tappings where provided shall meet 70 V and 100 V ratings.

*Safety requirements for mains operated electronic and related apparatus for household and similar general use.

4.7 The Preferred Matching Values — for loudspeakers and load impedance shall be in accordance with IS : 9302 (Part X)-1980*.

5. POWER SUPPLY

5.1 The amplifier shall be capable of operating either from ac main or battery or both.

NOTE — Battery operation can be from storage battery, or dry battery or both.

5.2 Mains Operation — The amplifier shall be designed to operate from 240 V \pm 10 percent 50 Hz ac power source.

6. SAFETY

6.1 Provision of 6 of IS : 9302 (Part I)-1979*, in addition to the following shall apply.

6.1.1 *Safety in Case of Faulty Connections*

6.1.1.1 Terminals meant for accepting power or for delivering power to other units shall be so designed as to provide adequate protection against misuse or faulty connection of power cords, plug-in units or any other auxiliaries proper to the normal use of the device and carrying sockets and connectors for this purpose.

6.1.1.2 Terminals meant for connection to dc power supply or meant to deliver dc power to other apparatus shall be marked as to polarity and possible connection to earth or chassis.

6.1.1.3 Selectors for power supply and output voltage, if meant to be set by the user, shall be marked with an indication of the kind of power supply and voltage concerned. Compliance shall be checked by inspection.

6.1.1.4 For amplifiers designed to be mounted in racks or enclosures, it is recommended that a check be made as to whether the terminals meant to be internally connected to the wiring in the enclosure are unambiguously identifiable, either by marking or by virtue of their position, with respect to the instructions for connection in the installation manual, it being assumed that these are to be read by skilled personnel.

7. MARKING

7.1 Provisions of 6 of IS : 9302 (Part II)-1979* shall apply.

*Characteristics and methods of measurements for sound system equipment:

Part I General.

Part II Amplifiers.

Part X Preferred matching values for the interconnection of sound system components.

8. OPERATING AND INSTRUCTION MANUAL

8.1 The operating manual containing relevant operating and other special instructions required for long operating life of the equipment shall be enclosed with the equipment. The current drain of the batteries shall also be specified.

9. TESTS AND REQUIREMENTS

9.1 Classification of Tests

9.1.1 *Type Tests* — All tests specified in the table shall be included as type tests and shall be carried out on one sample. There shall be no failure.

9.1.2 *Acceptance Tests* — The acceptance tests shall be as follows:

- a) Rated input voltage,
- b) Rated output power,
- c) Regulation,
- d) Effective frequency range, and
- e) Rated signal-to-noise ratio.

9.1.2.1 The number of samples and acceptance criteria is given in Appendix A.

9.1.3 *Routine tests* — The routine tests shall be as follows:

- a) Rated output power, and
- b) Rated signal-to-noise ratio.

9.2 Test Schedule — The test schedule specifies all the tests, their methods of measurements as well as the requirements to be met with.

9.2.1 The test schedule shall be as given in Table 1.

9.3 Power Bandwidth — The method of measurement shall be as specified below:

Method of Measurement

- a) Amplifier shall be brought under rated conditions.
- b) By keeping all other setting for rated conditions, source e m f (1 kHz) shall be adjusted so that rated total harmonic distortion is obtained. The output power is noted in this condition.
- c) Frequency of the source shall be varied, both on higher and lower side of 1 kHz, keeping total harmonic distortion constant at its rated value, reducing source e m f, if necessary to meet this total harmonic distortion. A graph shall be plotted giving output power in dB relative to the rated output power on Y axis and frequency on X axis (Log Scale). This is termed output power vs frequency at constant total harmonic distortion'.

- d) Low and high end frequencies at which output power is 3 dB below rated output power are read from the graph. Interval between these two frequencies is the power bandwidth.
- e) If graph is not necessary, it is possible to find only the low and high frequency limits of the power bandwidth, by trial and error to save measuring time.

TABLE 1 TEST SCHEDULE

(Clause 9.2.1)

SL No.	CHARACTERISTIC	METHOD OF MEASUREMENT		REQUIREMENTS
(1)	(2)	(3)		(4)
i)	Visual examination	8·2 of IS : 9302 (Part II)-1979*		8·2 of IS : 9302 (Part II)-1979*
ii)	Operational test	8·3	do	8·3 of IS : 9302 (Part II)-1979*
iii)	Rated input voltage	8·6	do	Rated input voltage shall be: <ul style="list-style-type: none"> a) $\leq 5\cdot0$ mV for high impedance mike inputs; b) $\leq 1\cdot0$ mV for low impedance mike inputs; c) ≤ 100 mV for ceramic phono/ auxiliary pick-up channel; and d) $\leq 4\cdot0$ mV for magnetic phono input. The source impedance being 0 to 300 Ω
iv)	Input impedance	8·5	do	Input impedance shall be: <ul style="list-style-type: none"> a) ≥ 47 kΩ for high impedance mike inputs; b) $\geq 1\cdot0$ kΩ for low impedance inks inputs; c) ≥ 470 kΩ for ceramic phone pick-up channel; and d) ≥ 47 kΩ for magnetic pick-up channel
v)	Rated output power	8·9	do	To be specified for 5 percent total harmonic distortion at 1 KHz
vi)	Temperature limited output power	8·14	do	It shall be at least 1/8 of the rated output power

NOTE — The test shall be performed at 45°C ambient temperature

*Characteristics and methods of measurements for sound system equipment : Part II Amplifier.

(Continued)

TABLE 1 TEST SCHEDULE — Contd

Sl No.	CHARACTERISTIC	METHOD OF MEASUREMENT	REQUIREMENTS
(1)	(2)	(3)	(4)
vii)	Regulation	8.10 of IS : 9302 (Part II)-1979*	The output signal regulation shall not exceed 30 percent of the rated voltage
viii)	Total harmonic distortion	8.22.1 do	The total harmonic distortion at the rated output power shall not exceed 5 percent over the frequency range of 250 Hz to 2 000 KHz
ix)	Effective frequency range	8.20 do	Effective frequency range shall be 100 Hz to 10 000 Hz within ± 3 dB, the reference frequency being 1 KHz
x)	Power bandwidth	9.3 of this standard	Power bandwidth shall be better than 200 Hz-8 KHz
xi)	Rated signal-to-noise ratio	8.26 of IS : 9302 (Part II)-1979*	Shall be > 55 dB one microphone channel open > 60 dB one [auxiliary channel open > 65 dB all channels closed
<p>NOTE — For high impedance microphone channels, the signal-to-noise ratio should be > 50 dB.</p>			
xii)	Environmental tests		
a)	Climatic sequence tests	9.4 of this standard	At the end of the climatic sequence test, the amplifier shall meet the following requirements: <ol style="list-style-type: none"> a) Rated input voltage shall be as specified in SI No. (iii) b) Rated output power shall be as specified in SI No. (v) c) Regulation shall be as specified in SI No. (vii) d) Effective frequency range shall be as specified in SI No. (ix) e) Rated signal-to-noise ratio shall be as specified in SI No. (xi)

*Characteristics and methods of measurement for sound system equipment: Part II Amplifiers.

(Continued)

TABLE 1 TEST SCHEDULE — *Contd*

Sl No.	CHARACTERISTIC	METHOD OF MEASUREMENT	REQUIREMENTS
(1)	(2)	(3)	(4)
b)	Bump test	9.5 of this standard	At the end of these environmental tests, the amplifier shall meet the following requirements: a) Rated output power shall be as specified in SI No. (v) b) Rated signal-to-noise ratio shall be as specified in SI No. (xi)
c)	Drop test	9.6 of this standard	At the end of these environmental tests, the amplifier shall meet the following requirements: a) Rated output power shall be as specified in SI No. (v) b) Rated signal-to-noise ratio shall be as specified in SI No. (xi)
d)	Dust test	9.7 of this standard	At the end of these environmental tests, the amplifier shall meet the following requirements: a) Rated output power shall be as specified in SI No. (v) b) Rated signal-to-noise ratio shall be as specified in SI No. (xi)
e)	Salt mist test	9.8 of this standard	At the end of these environmental tests, the amplifier shall meet the following requirements: a) Rated output power shall be as specified in SI No. (v) b) Rated signal-to-noise ratio shall be as specified in SI No. (xi)

9.4 Climatic Sequence Test — The climatic sequence test should consist of the following:

- a) Dry heat test (at a temperature of +40°C and duration of 16 hours) in accordance with IS : 9000 (Part III)-1977*;
- b) Damp heat test, first cycle in accordance with IS : 2106 (Part II)-1962† at a temperature of 40°C and 95 percent RH;
- c) Cold test (at a temperature of 0°C and duration of 12 hours) in accordance with IS : 9000 (Part II)-1977*; and
- d) Damp heat test, second cycle in accordance with IS : 2106 (Part II)-1962† at a temperature of 40°C and 95 percent RH, followed by a recovery period of 24 hours.

9.5 Bump Test — The test shall be conducted with the following severities, in accordance with IS : 9000 (Part VII/Sec 2)-1979*:

Acceleration 40 g	Height 25 mm
No. of bumps on the base	1 000

9.6 Drop Test — The test shall be conducted in accordance with IS : 9000 (Part VII/Sec 3)-1979*, the number of drops being 6 and the height of drop being 25 mm.

9.7 Dust Test — The test shall be conducted in accordance with IS : 2106 (Part XII)-1965† at a temperature of 40°C and duration of 4 hours.

9.8 Salt Mist Test — The test shall be conducted in accordance with IS : 2106 (Part XVIII)-1973† at a temperature of 35°C and duration of 2 hours.

*Basic environmental testing procedures for electronic and electrical items :

- Part II Cold test.
- Part III Dry heat test.
- Part VII Impact test,
Section 2 Bump.
Section 3 Drop and topple.

†Environmental tests for electronic and electrical equipment.

- Part XII Dust test.
- Part XVIII Salt mist

APPENDIX A

(Clause 9.1.2.1)

SAMPLING AND CRITERIA FOR CONFORMITY

A-1. LOT

A-1.1 All the public address amplifiers equipments of the same model and type having the same design and manufactured by the same technique under eventually similar conditions of production shall constitute a lot.

A-1.1.1 Samples shall be taken and tested to ascertain the conformity of each lot for acceptance tests.

A-2. SCALE OF SAMPLING

A-2.1 Public address amplifiers equipments shall be taken at random according to col 1, 2 and 3 of Table 2 (see IS : 4905-1968*).

TABLE 2 SCALE OF SAMPLING AND CRITERIA FOR CONFORMITY

(Clauses A-2.1, A-3.1 and A-3.1.1)

LOT SIZE (N)	FIRST SAMPLE (N_1)	SECOND SAMPLE (N_2)	COMBINED SAMPLE ($N_1 + N_2$)	ACCEPTANCE NUMBER	REJECTION NUMBER
(1)	(2)	(3)	(4)	(5)	(6)
Up to 150	5	5	10	0	2
151 to 300	8	8	16	0	2
301 and above	13	13	26	0	2

A-3. NUMBER OF TESTS AND CRITERIA FOR CONFORMITY

A-3.1 Public address amplifiers equipments shall be drawn from each lot according to col 1 and 2 of Table 2 and subjected to the acceptance tests, specified in 9.1.2. If an equipment fails in any one of the acceptance tests, it shall be called a defective. If the number of defectives found in the first sample (see col 2) is zero (see col 5), the lot shall be considered as conforming to the acceptance tests. If the number of defectives is equal to or greater than 2 (see col 6), the lot shall be considered as not conforming to the acceptance tests.

A-3.1.1 If the number of defectives is equal to 1, further sample of the equipment shall be taken according to col 3 of Table 2 and tested for all the acceptance tests. If the number of defectives in the combined sample (see col 4) is less than 2 (see col 6), the lot shall be considered as conforming to the acceptance test; otherwise rejected.

*Methods for random sampling.

INTERNATIONAL SYSTEM OF UNITS (SI UNITS)

Base Units

QUANTITY	UNIT	SYMBOL
Length	metre	m
Mass	kilogram	kg
Time	second	s
Electric current	ampere	A
Thermodynamic temperature	kelvin	K
Luminous intensity	candela	cd
Amount of substance	mole	mol

Supplementary Units

QUANTITY	UNIT	SYMBOL
Plane angle	radian	rad
Solid angle	steradian	sr

Derived Units

QUANTITY	UNIT	SYMBOL	DEFINITION
Force	newton	N	1 N = 1 kg.m/s ²
Energy	joule	J	1 J = 1 N.m
Power	watt	W	1 W = 1 J/s
Flux	weber	Wb	1 Wb = 1 V.s
Flux density	tesla	T	1 T = 1 Wb/m ²
Frequency	hertz	Hz	1 Hz = 1 c/s (s ⁻¹).
Electric conductance	siemens	S	1 S = 1 A/V
Electromotive force	volt	V	1 V = 1 W/A
Pressure, stress	pascal	Pa	1 Pa = 1 N/m ²